NORTH TABLE MOUNTAIN WATER AND SANITATION DISTRICT
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NORTH TABLE MOUNTAIN REPORT
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PART 2- HISTORY OF WATER TREATMENT AND DISTRIBUTION

Water Treatment: During the mid to late 1800s, scientists gained a greater understanding of the sources and effects of drinking water contaminants, especially those that were not visible to the naked eye. In 1855, epidemiologist Dr. John Snow proved that cholera was a waterborne disease by linking an outbreak of illness in London to a public well that was contaminated by sewage. In the late 1880s, Louis Pasteur demonstrated the "germ theory" of disease, which explained how microscopic organisms (microbes) could transmit disease through media like water.

Chief chemists work in the water quality lab of the Denver Union Water Company in this 1896 photo.

During the late nineteenth and early twentieth centuries, concerns regarding drinking water quality continued to focus mostly on disease-causing microbes (pathogens) in public water supplies. Scientists discovered that turbidity (particles suspended in water) was not only an aesthetic problem but could also harbor potentially deadly pathogens. As a result, the design of most drinking water treatment systems built in the U.S. during the early 1900s was driven by the need to reduce turbidity, thereby removing microbial contaminants that were causing typhoid, dysentery, and cholera epidemics. To reduce turbidity, some water systems in U.S. cities (such as Philadelphia) began to use slow sand filtration.

While filtration was a fairly effective treatment method for reducing turbidity, it was disinfectants like chlorine that played, and continue to play, the largest role in reducing the number of waterborne disease outbreaks. In 1908, chlorine was used for the first time, in the United States, as a primary disinfectant of drinking water in Jersey City, New Jersey.

Federal regulation of drinking water quality began in 1914, when the U.S. Public Health Service set standards for the bacteriological quality of drinking water. The Public Health Service revised and expanded these standards in 1925, 1946, and 1962. The 1962 standards, regulating 28 substances, were the most comprehensive federal drinking water standards in existence before the Safe Drinking Water Act of 1974. With minor modifications, all 50 states adopted the Public Health Service standards either as regulations or as guidelines for all of the public water systems in their jurisdiction.

Denver Water touting the filtration and disinfection of water and resulting cholera prevention. Circa 1911

<u>Water Distribution</u>: In 1652, Boston became home to this nation's first waterworks. Fires were a common hazard in that period of wood-framed homes and fireplaces and a ready water supply was paramount. Bored-out hemlock and elm tree logs of seven to nine foot lengths attached together with pitch or tar or sometimes even iron hoops were used as distribution mains and supplied the bustling water front city from Jamaica Pond to the Faneuil Hall area. Wood proved problematic for several reasons: uneven ground caused the logs to sag and hold stagnated water; insects infested the pipes, the wood rotted, and the water often tasted woody and unpleasant. In addition, the increased pressure required to pump water into rapidly expanding cities began splitting the wooden pipes. Around this time, iron became more readily available, and cities began using it in their distribution systems, although pipes constructed of wood would continue to be manufactured for many years, some of which are still in use throughout the country today.

Chicago Water Tower

In 1804, Philadelphia became the first city in the world to utilize cast iron pipes for water mains and the first city to build a large-scale waterworks, which drew from the Schuykill River. New York City followed suit with a water distribution project that consisted of 41 miles of channel with a constant slope of 13.5 inches per mile. Completed in 1842, the project also had 16 tunnels, 114 culverts, and a bridge over the Harlem River.

In 1851 Chicagoans, in an effort to combat reoccurring deadly cholera outbreaks, organized the city's first water board. In 1869, the city, and its water board, made worldwide newspaper headlines when it unveiled its incredible engineering feat of twin underground tunnels, one of which reached two miles out into Lake Michigan, to supply the city with water. The first tunnel contained a 138-foot tall, three-foot wide standpipe that equalized pressure in the city's mains. The standpipe survived the Great Chicago Fire of 1871 and still stands today as a historical structure. Steam-driven engines drew water from Lake Michigan and provided 15 million gallons per day to the city's water mains. Today, six engines pump 72.5 million gallons per day to the city of Chicago.

To be continued: Part 3 will focus on some modern aspects of water treatment and distribution

Sources: EPA.org, Illinois History Journal, Chicago Tribune and DenverWater.org